

Monitoring the State of the ST. LAWRENCE RIVER

BIOLOGICAL
RESOURCES

WATER

SEDIMENTS

SHORELINES

USES

SEABIRDS

Sentinel Species For the Gulf

Background

The Estuary and Gulf of St. Lawrence are very productive marine ecosystems abounding in wildlife resources. Seabirds are an important link in these ecosystems. Their abundance and population trends reflect the dynamics of the processes that maintain the integrity of the St. Lawrence marine

environment. In this context, we can learn something about the state of health of the Gulf of St. Lawrence by analyzing population trends in seabirds living in the migratory bird sanctuaries on the North Shore of the Gulf of St. Lawrence (Figure 1). These observations are based on bird censuses conducted every five years since 1925.

Sixteen different species of seabirds occupy these sanctuaries during the breeding season. Their numbers depend on the availability, abundance and quality of the food here, although certain anthropogenic factors can also come

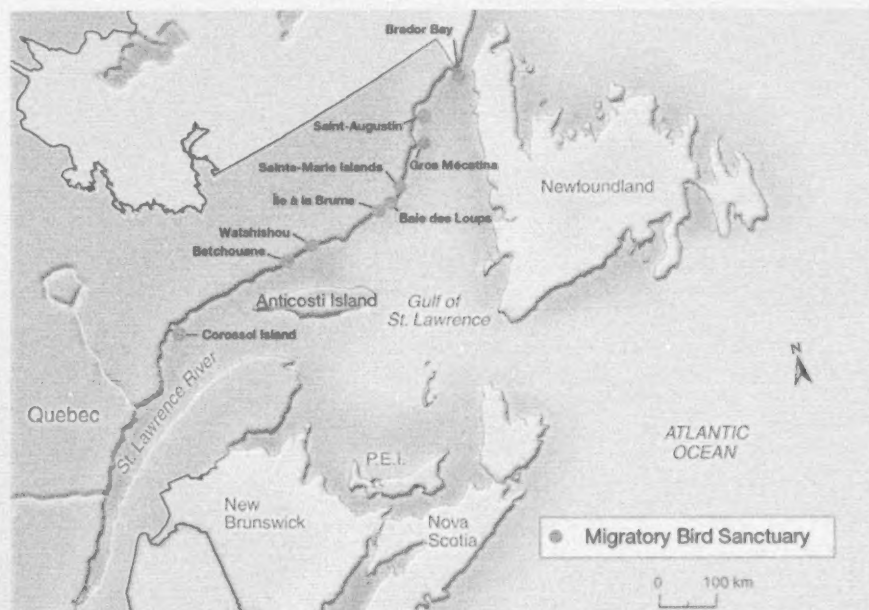


Figure 1 Migratory bird sanctuaries on the North Shore

into play. As most seabirds are piscivorous (fish eaters), it is normal that population trends are closely linked to changes in fish communities, as well as to the commercial fishery. Five species of seabirds were selected as bioindicators of the state of health of the Gulf of St. Lawrence.

One of these species, the Herring Gull, is relatively abundant, nesting in a number of colonies scattered throughout both the Estuary and Gulf of St. Lawrence. This bird is a familiar sight to those who live near the sea, being ubiquitous at fishing harbours, where it feasts on the discards of commercial fishers. Of course, gulls are also capable of catching their own prey, mostly fish like sand lance and capelin, as well as shellfish, crustaceans and insects. The Caspian Tern, a member, like the gull, of the Laridae family, is much rarer and nests at only one site in Quebec, on Ile à la Brume, not far from the village of La Romaine. Like the Herring Gull, the Caspian Tern also feeds at the water's surface, but its diet does not include any fish offal.

The feeding habits of three members of the Alcidae family – the Common Murre, Razorbill and Atlantic Puffin – are much more specialized. Unlike larids, alcids dive below

the water's surface for their prey, feeding primarily on the small forage fish that are the basic food of seabirds, marine mammals and large predator fish like cod. Sand lance and capelin are a part of this food chain, constituting the main food of these three seabird species.

Overview of the Situation

The abundance of Herring Gulls in North Shore bird sanctuaries grew steadily between 1925 and 1977 and then accelerated, rising from 10 089 individuals in 1977 to 22 409 in 1988 — an annual growth rate of 7.2%. In 1993, however, surveys showed that the number of nesting adults had fallen by some 70% (Figure 2).

This period of declining growth corresponds to the decline in cod fish stocks in the Gulf of St. Lawrence. The cod decline accelerated towards the end of the 1980s and early 1990s, leading to a moratorium imposed on fishers by Fisheries and Oceans Canada in 1994. As the cod fishery represented close to 90% of the groundfish fishery on the North Shore and a major source of the fish waste discarded at sea, scientists were able to establish a link between gull

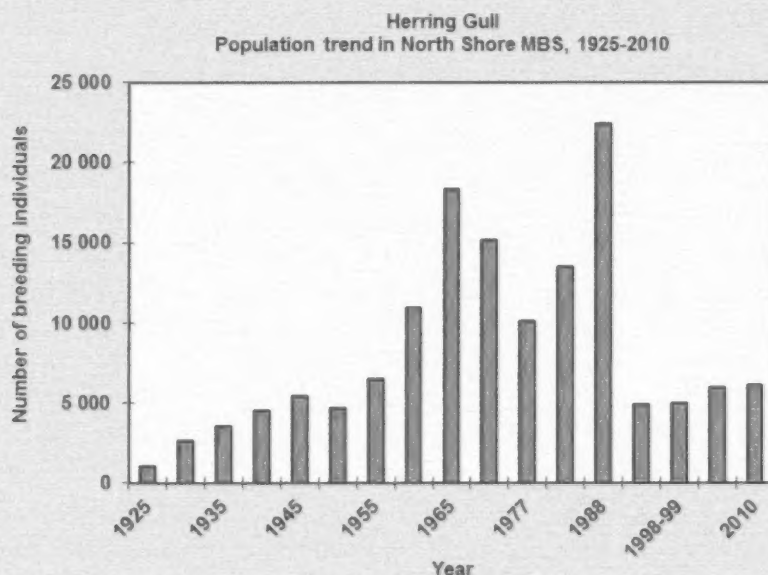


Figure 2 Population trends in Herring Gulls in migratory bird sanctuaries between 1925 and 2010

population numbers and cod landings at fishing harbours on the North Shore. Scavenger species, it would seem, benefited from fish offal discarded at sea to increase their breeding success and thus grow their populations. The link between gulls and landings of cod has proven conclusive in explaining population trends in Herring Gulls on the North Shore. This finding lends credence to the notion that better management of commercial fisheries discards would have slowed down the population growth of Herring Gulls. Since then, populations have been stable or smaller than they were. The relationship between this species and the management of commercial fisheries offal and discards should be borne in mind, in case populations were to increase again.

The migratory bird sanctuary of Ile à la Brume near La Romaine is the Caspian Tern's only regular nesting ground in Quebec. The first mention of nesting in this area dates back to 1884, when some 400 birds were observed. Subsequent 5-year surveys tracked trends in the size of the colony, which varied from 30 to 100 birds from 1925 until 1950, when it was first noticed that the terns had deserted

the site. Five years later, 76 individuals were counted, but the number of nesting pairs diminished rapidly thereafter. The colony more or less maintained itself until 1988, but during the surveys in 1993 and 1999, not a single Caspian Tern was seen (Figure 3). The most plausible cause for the species' disappearance would be disturbance by humans and poaching. Happily, the species has not disappeared completely, as 3 specimens were sighted in the sanctuary in 2005 and 2010.

A seabird breeding population downsized to only a few individuals in this part of the Gulf of St. Lawrence illustrates the fragility of every element in an ecosystem. The tern would not be the first nesting species to be extirpated from the Gulf of St. Lawrence. Past extermination of the Labrador Duck and the Great Auk resulted in a loss for the biodiversity of the St. Lawrence.

Alcids were present in much greater numbers 200 years ago compared to today. This is mostly because all seabird species have been hunted for their meat, their eggs and their feathers. The Common Murre, Razorbill and Atlantic

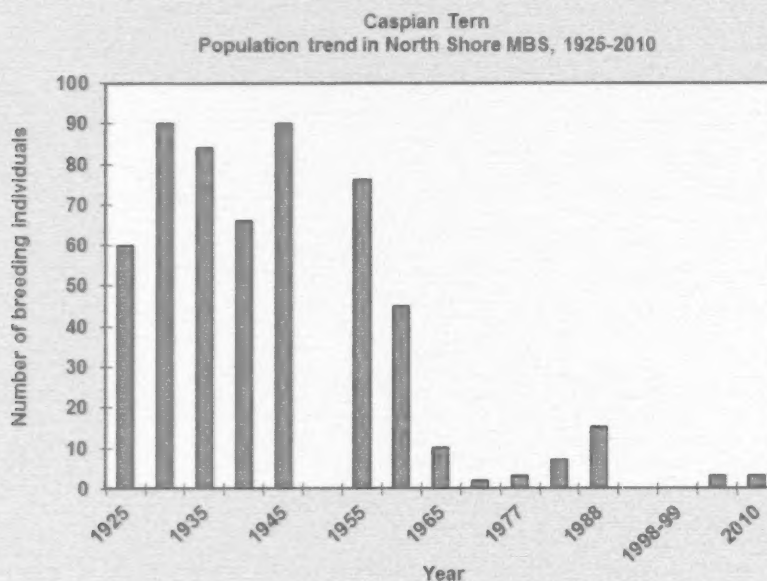


Figure 3 Population trends in Caspian Terns in the bird sanctuary on Ile à la Brume between 1925 and 2010

Puffin, each of which lays a single egg once a year, have not escaped this commercial exploitation. According to the accounts of naturalists, around 1840, more than 750 000 Common Murre eggs were taken annually from North Shore colonies to be sold at markets in Halifax. In 1925, during the first bird survey, barely more than 7000 nesting individuals of this species were counted in the North Shore migratory bird sanctuaries, providing a good illustration of the impact that commercial exploitation had on these populations at the turn of the last century. It was only sometime around 1980 that their population numbers began to rise, climbing to about 30 000 individuals in 1998–1999 (Figure 4).

The Common Murre, Razorbill and Atlantic Puffin all proliferated on the North Shore in the 1980s and early 1990s. Two factors may have contributed to rebuilding

their populations: improvements made to the surveillance system in the sanctuaries between 1980 and 1995, and an increased abundance of forage-fish species. Despite these growths, however, we are far from the numbers that fully reflect the abundance and richness of the wildlife present in this marine ecosystem in the 19th century.

The Razorbill and the Atlantic Puffin are species whose diet is very similar to that of the murre. However, while the number of Razorbills steadily increased after 1993 (Figure 5), the population of Atlantic Puffin declined by over 50% (Figure 6), whereas the Common Murre population stabilized or decreased slightly (Figure 4). The causes of these trends may be numerous and require further study.

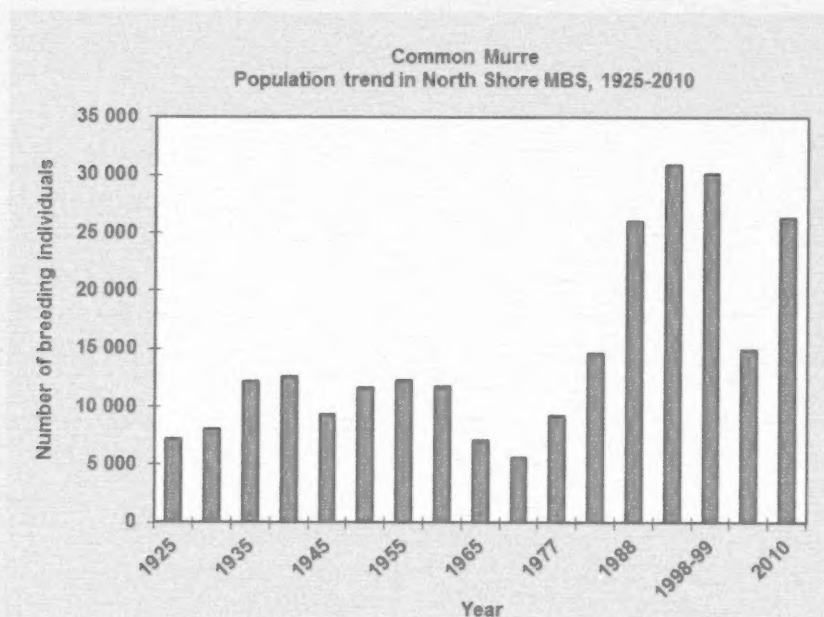


Figure 4 Population trends in Common Murres in migratory bird sanctuaries between 1925 and 2010

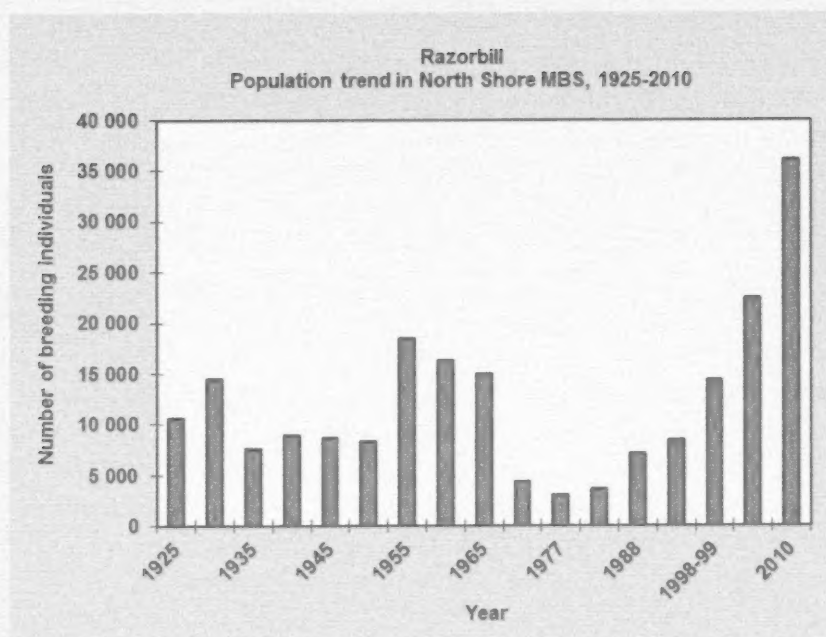


Figure 5 Population trends in Razorbills in migratory bird sanctuaries between 1925 and 2010

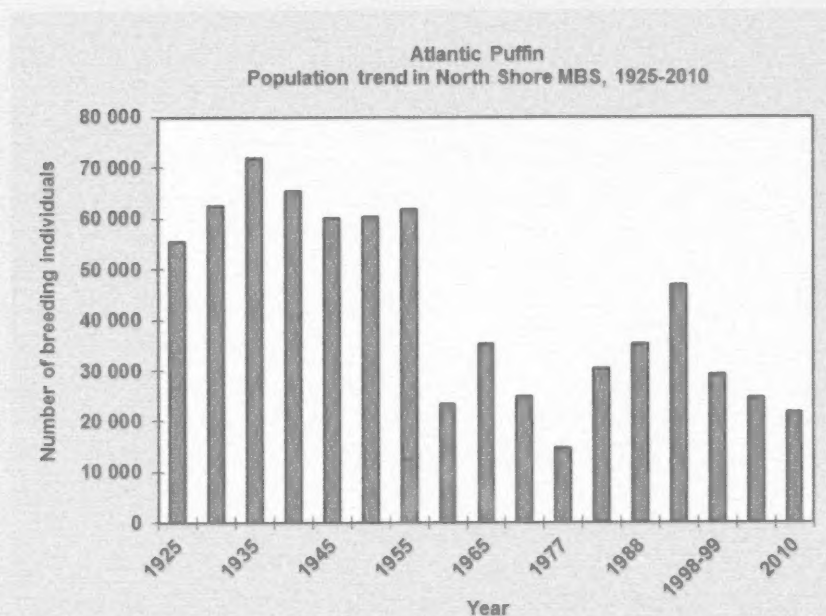


Figure 6 Population trends in Atlantic Puffins in migratory bird sanctuaries between 1925 and 2010

To Know More

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State of the St. Lawrence Monitoring Program

Four government partners—Environment Canada, Fisheries and Oceans Canada, Parks Canada Agency, and the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques—and Stratégies Saint-Laurent, a non-governmental organization that works actively with riverside communities, are pooling their expertise and efforts to provide Canadians with information on the state of the St. Lawrence and its long-term evolution.

To this end, environmental indicators have been developed on the basis of data collected as part of each organization's ongoing environmental monitoring activities. These activities cover the main components of the environment, namely water, sediments, biological resources, uses and shorelines.

For more information on the State of the St. Lawrence Monitoring Program, please visit the program website at www.planstlaurent.qc.ca/en.

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